introduction he writes as follows :—"My greatest obligation is to Mr. William Gilbertson, of Preston, a naturalist of high acquirements, who has for many years explored with exceeding diligence a region of mountain limestone, remarkably rich in organic remains. The collection which he has amassed from the small district of Bolland is at this moment unrivalled, and he has done for me, without solicitation, what is seldom granted to the most urgent entreaty; he has sent me for deliberate examination, at convenient intervals, THE WHOLE OF HIS MAGNIFICENT COLLECTION, accompanied by remarks dictated by long experience and a sound judgment." He (Gilbertson) had proposed to publish on the *Crinoidea* himself, but his sketches, as well as his specimens, were all placed at Prof. Phillips's disposal. Phillips adds: "An attentive examination of this rich collection rendered it unnecessary to study minutely the less extensive series preserved in other cabinets; . . . . *most of the figures of fossils are taken from specimens* in Mr. Gilbertson's collection, because these were generally the best that could be found."

The Gilbertson Collection was purchased for the British Museum in 1841.

The collections which follow mark a distinct era in the annals of geological science. Some forty-seven years ago a little Society was founded by a few London geologists—namely, Dr. J. Scott Bowerbank, F.R.S., Searles V. Wood, Prof. John Morris, Alfred White, Nathaniel T. Wetherell, James de Carle Sowerby, and Frederick E. Edwards—for the purpose of illustrating the Eocene Mollusca, and entitled the "London-Clay Club." They met at stated periods at each other's houses, and after a time they said, "Why should we not illustrate all the fossils of the British Islands, and from every formation?" No sooner proposed than a Society was founded, called the "Palæontographical Society," in the year 1847 (just forty years ago). The first volume, issued in that year, was "The Crag Mollusca, Part I., Univalves," by Mr. Searles V. Wood (with twenty-one plates).

The "Searles Wood Crag Collection" was commenced in 1826, and occupied about thirty years in its formation. It represents the Molluscan fauna of the Red and Coralline Crags of the neighbourhood of Woodbridge, and from Aldborough, Chillesford, Sudbourne, Oxford, Butley, Sutton, Ramsholt, Felixstowe, and many other localities in Suffolk, also from Walton-on-the-Naze in Essex. The specimens so collected were employed by Mr. Searles Wood in the preparation of his Monograph on the Crag Mollusca, published by the Palæontographical Society (1848-61); with supplements in 1871, 1873, and 1879, illustrated by seventy-one quarto plates. Each figured specimen is indicated by having a small green label affixed to it.

A geological description of the Crag formation by Mr. S. V. Wood, Jun., and Mr. F. W. Harmer, was issued by the Palæontographical Society in 1871 and 1873.

The collection was presented by Mr. S. V. Wood to the British Museum, January 1856, and a supplementary collection was given by Mrs. Searles V. Wood in 1885.

The next "Palæontographical Collection" is of nearly equal antiquity and fully of equal merit. It is the Eocene Molluscan Collection formed by the late Mr. Frederick E. Edwards, about the year 1835, and was continually being added to, until a few years before his death, which happened in 1875. It was acquired for the nation by purchase in 1873.

Originally intending to illustrate the fossils of the London Clay, Mr. Edwards extended his researches over the Eocene strata of Sussex, Hampshire, and the Isle of Wight, where, assisted by Mr. Henry Keeping, he made the most complete collection ever attempted by any geologist, and it still remains unrivalled.

Mr. Edwards contributed six memoirs to the Palæontographical Society, 1848-56, also separate papers to the *London Geological Magazine*, 1846, the *Geologist*, 1860, and the *Geological Magazine*, 1865, descriptive of the Eocene Mollusca, in his collection.

Mr. S. V. Wood continued the work for Mr. Edwards, describing and figuring the "Eocene Bivalves" in the annual volumes of the Palæontographical Society for 1859, 1862, 1870, and 1877. Each specimen which has been figured is specially marked.

About 500 species have been described and figured, but the collection is very rich in new and undescribed forms.

The last collection is that of a naturalist who devoted his entire life to the study and illustration of a single class of organisms, namely the Brachiopoda. It was formed by the late Dr. Thomas Davidson, F.R.S. (of 9 Salisbury Road, West Brighton, and Muir House, Midlothian), between the years 1837 and 1886, with the object of illustrating his great work on the "British Fossil Brachiopoda," published by the Palæontographical Society, in six large quarto volumes between the years 1850 and 1886, comprising 2290 pages of text, and 234 plates, with 9329 figures, and descriptions of 969 species.

Dr. Davidson was also the author of the Report on the recent Brachiopoda collected by H.M.S. *Challenger* (vol. i. 1880); of the article "Brachiopoda," in the "Encyclopædia Britannica," ninth edition, 1875; of a Monograph of "Recent Brachiopoda" (Trans. Linnean Society, 1886 and 1887), and of more than fifty other separate memoirs mostly bearing upon Brachiopoda both recent and fossil, printed in the Transactions and Journals of the various learned Societies, &c.

His collection, both of Recent and Fossil Brachiopoda, together with all Dr. Davidson's original drawings, his numerous books and pamphlets, were presented by him to the British Museum through his son Mr. William Davidson, February 1886. By his direction the entire collection of recent and fossil species are to be kept together in one series, for the convenience of reference of all men of science who may wish to consult the same.

NOTES.

ON Tuesday the Technical Instruction Bill was read a second time. The second reading having been moved by Sir W. Hart Dyke, Mr. S. Leighton proposed an amendment which would have led to the rejection of the measure, on the ground that a new change ought not at present to be imposed on ratepayers. The amendment was negatived; but in dealing with it Mr. Goschen and Mr. W. H. Smith found it necessary, as Mr. Mundella complained, to adopt a very "apologetic" and "persuasive" tone. The fact seems to indicate that a good many members of the House of Commons do not even yet realize that an adequate system of technical instruction is absolutely necessary to enable this country to hold its own in the industrial and commercial warfare of the present age.

IN a memorandum on the Scotch Technical Schools Bill, which has been introduced by the Lord Advocate, it is stated that, "as there is a School Board in every parish and burgh in Scotland, it is unnecessary to extend the powers of the Bill to any other local authority." The Bill is not to take effect in any parish or burgh until after the triennial election of a new School Board next year; and the resolution of a Board to establish a technical school requires confirmation at a second meeting of the Board, and also by the Scotch Education Department. While the subjects to be taught in the technical schools will be determined by the Department of Science and Art, the schools will in other respects be under the Scotch Education Department. No scholar will be admitted into a technical school until he has passed the fifth standard, which in Scotland frees from the obligation to attend an elementary school. The proposal that adults above the age of twenty-one shall not be eligible for admission to technical schools maintained out of the rates ought to be rejected. If adults desire to attend these institutions, there seems to be no good reason why their wish should not be gratified.

On Wednesday, the 3rd inst., the Local General Committee appointed to make arrangements for the Manchester meeting of the British Association assembled in the Town Hall, Manchester, to receive the report of the Executive Committee. Mr. Alderman Goldschmidt presided, and there was a numerous attendance. In the report, which was adopted, the Executive Committee gave a most satisfactory account of the efforts which had been made to secure the success of the meeting. Attention was especially called to the number of eminent foreign visitors who are expected to be present, and it was definitely announced that among these visitors will be the Emperor of Brazil, who has been a member since 1871. Of the members of the Association more than a thousand have already expressed their intention of attending the meeting, and many ladies and gentlemen have sent in their names as new members or associates. The Executive Committee pointed out that at previous meetings of the Association a large proportion of the visitors had received offers of hospitality, and they expressed a confident hope that Manchester would not fail in this respect. Numerous excursions have been arranged for Saturday, September 3, and Thursday, September 8; and offers of hospitable entertainment have been received and accepted in connexion with several of these. The Duke of Devonshire has invited a party to Bolton Abbey; and invitations have been received from the Duke of Westminster to visit Eaton Hall; from W. H. Foster, Esq., and Sir Thomas Storey, to visit Hornby Castle and Lancaster; from W. Morrison, Esq., M.P., to visit Malham and Gordale; from the Rev. M. Farrer, to visit Ingleborough; and from the Directors of the London and North-Western and Lancashire and Yorkshire Railway Companies to visit their Locomotive Works at Crewe and Horwich. Hospitable offers have also been received in connexion with excursions to Northwich, Buxton, Stonyhurst, Tatton, Macclesfield, Gawsworth, Clitheroe, the Liverpool Docks, the Longdendale Reservoirs, and Worsley. The Liverpool Marine Biological Committee have arranged for a day's dredging expedition; an invitation has been received for a visit to the Isle of Man at the close of the meeting; and several other excursions have been organized. Many of the principal works and mills will be open for inspection during the meeting.

The following is the programme of the Manchester meeting of the British Association:—Wednesday, August 31, President's Address, in the Free Trade Hall, at 8 p.m. Thursday, September 1, Sectional Meetings, 11 a.m. to 3 p.m.; *conversazione* at the Royal Jubilee Exhibition, by invitation of the Executive Committee of the Exhibition, 7.30 to 11 p.m. Friday, September 2, Sectional Meetings, 11 a.m. to 3 p.m.; lecture by Prof. H. B. Dixon, F.R.S., on "The Rate of Explosions in Gases," in the Free Trade Hall, at 8.30 p.m. Saturday, September 3, Sectional Meetings, 11 a.m. to 1 p.m.; excursions; lecture to working men by Prof. George Forbes, F.R.S., on "Electric Lighting," in the Free Trade Hall, at 8 p.m. Monday, September 5, Sectional Meetings, 11 a.m. to 3 p.m.; lecture by Colonel Sir Francis de Winton, K.C.M.G., R.A., on "Explorations in Central Africa," in the Free Trade Hall, at 8.30 p.m. Tuesday, September 6, Sectional Meetings, 11 a.m. to 3 p.m.; *conversazione* at the Town Hall, by invitation of the Right Worshipful the Mayor of Manchester. Wednesday, September 7, General Meeting in the Chemistry Lecture Theatre of Owens College, at 2.30 p.m. Thursday, September 8, excursions.

The Royal Archæological Institute has had a very successful series of meetings in Salisbury and the neighbourhood. On Tuesday, the last day of the Congress, the members were entertained at luncheon at Rushmore Park by General Pitt-Rivers, the President. He conducted the party to Woodcutts, where he has lately discovered the remains of a Romano-British village. The skeletons dug up show that the people, whoever they were, that inhabited this village were very inferior in stature, the males being on an average only 5 feet 2 inches in height, and the women only 4 feet 10 inches. General Pitt-Rivers has in his museum a very large collection of articles that must have been in daily use among them, including coins, both British and Roman, brazen, silver, and gilt fibulæ, knife-handles, chains, tweezers, bracelets, locks, padlocks, flint arrow-heads, fish-hooks, and horse-shoes, to say nothing of a bowl of Samian ware and the bricks of a hypocaust. The members, having seen all that General Pitt-Rivers had to show them, agreed that he "had kept the most interesting of all the days and the best of his treasures for the last."

Science announces the death of Dr. Charles Rau, Curator of the Archæological Department of the National Museum at Washington. America owes to him the excellent arrangement of the large prehistoric collections at Washington. His writings on American archæology, contained in the annual reports of the Smithsonian Institution and in various journals, and his recent work, "Prehistoric Fishing in Europe and North America," secured for him a high place among American archæologists.

The subscription made by some friends of the late Dr. Walter Flight, F.R.S., has resulted in a sum of £317. This amount has been handed over to Mr. Basil Martineau, of Hampstead, and Mr. Henry Basset, F.C.S., of Barnsbury, who have kindly consented to act as trustees on behalf of Mrs. Flight. The Committee of the Fund, anxious to avoid expense, trust that the subscribers will excuse the printing and circulating of individual notices to the above effect.

We have more than once referred to the scheme promoted from Kew for the establishment of minor Botanical Gardens in the several West Indian Islands. The gardens of the Windward Islands are to be in correspondence, as far as relates to the supply of useful plants, and information concerning them, with the chief Botanical Department in Jamaica. The Island of Grenada has been the first to take advantage of the new scheme. Its newly established Botanic Garden was opened to the public on July 18. Barbadoes has recently recorded its adhesion. We learn with much regret that the members of the group of Leeward Islands decline at present to take any part in the scheme.

The *Annalen der Hydrographie und maritimen Meteorologie* of the German Hydrographic Office for July contains the first part of the discussion of the daily synoptic weather charts of the North Atlantic Ocean and adjacent parts of the continents for the autumn of 1883, viz. for the months September to November (see Nature, June 16, p. 159), thus commencing from the period undertaken by the Meteorological Council. The discussion is accompanied by nine charts, showing clearly (1) the paths of the barometric minima, (2) the position and changes of the barometric maxima, and (3) the mean position of the isobar of 765 mm. (30·119 inches) for fifteen periods of three to nine days each. The same number also contains a comprehensive discussion of the rainfall of Mauritius and neighbouring portions of the Indian Ocean, compiled from the observations published by Dr. Meldrum and all other available sources, by Dr. W. Köppen.

The volume of "Hourly Readings" of the self-recording instruments at the Observatories in connexion with the Meteorological Office for the year 1884, the last part of which is just published, contains two elaborate appendixes:—(1) The harmoni analysis of the diurnal range of air-temperature at seven Observatories for each month of the twelve years 1871-82. The numerical results have been obtained directly from the continuous photographic records by means of Sir William Thomson's harmonic analyzer. A comparison of the monthly means obtained from the machine with those got by calculation shows that the results obtained by the former are as accurate as those obtained very much greater labour by the latter method. (2) Tables and formulæ, by Lieut.-General R. Strachey, R.E., C.S.I., to facilitate the computation of harmonic coefficients in the form p_1 cos n 15°, &c., and in the form P sin (n 15° + τ°). Tables are calculated for the coefficients of p and q from hourly values, harmonic coefficients from five-day means, non-periodic corrections, and multiples of the usual sines. Tables of multiples of the natural and logarithmic sines, &c., have been previously published, but we know of nothing which at all compares in detail and usefulness with the tables now in question, for the calculations which they are intended to simplify.

Dr. von Lendenfeld's account of his investigations in the Australian Alps, published in Ergänzungsheft No. 87 of *Petermann's Mitteilungen* (see Nature, July 21, p. 283), contains some interesting observations on the meteorology of that district, especially with respect to rainfall. He found that the mountainous part of the continent has much more rain than any other part of temperate Australia south of the zone of tropical rains. At Hiandra, to the north of the Kosciusko group, it amounts to 61 inches; while between the mountains and the coast the amount is small, being only 18 inches at Cooma. Some places to the west of the mountains, and still in sight of them, suffer much from want of water. Generally speaking there appears to be no connexion between the weather on the Alps and that on the coast. On the latter most rain falls in autumn, while on the mountains the spring is especially wet. In the middle of summer (January and February) rainfall is least both on the mountains and on the coast. In the lowlands precipitation always falls as rain, while on the mountains snow falls at all times of the year, and it never rains in winter. The amount of dew is exceedingly great, but as this is only taken into account in the total amount of the rainfall, the climate of the mountains appears drier than it really is. There are not sufficient observations to determine the temperature and wind conditions accurately, and these can only be estimated from the behaviour of the snow. At heights exceeding 1000 metres (3280 feet) the snow lies for a month or two, and above 2000 metres it is met with in places, even in the height of summer. Snow-drifts are found exclusively on the eastern slopes, which clearly proves the prevalence of westerly winds in winter.

It has been arranged at the Hong Kong Observatory that Mr. Knipping will, as heretofore, investigate typhoons within the area of the Japanese weather-maps, as well as north and east of that area. Father Faura will investigate the typhoons in their passage across the Philippine Archipelago, and those that approach very near the coast of Luzon. Dr. Doberck will investigate typhoons at sea south and west of Mr. Knipping's district, from information collected from men-of-war and merchant vessels, and typhoons in China from the facts recorded in the returns of the Imperial Chinese Maritime Customs.

A novel series of voltaic combinations, in which solutions of alterable compounds are substituted for the attackable metals, has lately been investigated by Dr. Alder Wright and Mr. C. Thompson (Journ. Chem. Soc., August 1887). The chief feature of the new cells consists in the replacement of the zinc or its equivalent by a plate of carbon, platinum, or other conducting but unchanged substance, immersed in a solution of some easily oxidized or chlorinated compound, and opposed to a similar plate in contact with the solution of a substance capable of being readily deoxidized or dechlorinated. The plate in contact with the oxidizable fluid acquires the lower potential or becomes the negative pole, while the other plate takes the higher potential and forms the positive pole with regard to the outer circuit. An almost endless variety of new combinations may thus be employed, some of which may be expected to develop considerable energy. A convenient cell, of electromotive force 1·5 volt, consists of a U-tube, into one limb of which is poured a solution of sodium sulphite, while a solution of "chromic liquor," that is, a mixture of sulphuric acid and potassium bichromate solution, is run into the other, a little moderately concentrated sulphuric acid being previously placed in the bend to prevent too rapid diffusion of the two. On placing the two platinum plates in their respective solutions and completing the external circuit by a wire, a constant current is maintained, owing to oxidation of the sulphite to sulphate, and reduction of the chromic acid to chromium sulphate. In all the cases examined the currents were remarkably steady, and capable of performing measurable amounts of electrolytical work.

Sir Philip Magnus has presented his Report on the technological examination held in 1887, under the direction of the City and Guilds of London Institute for the Advancement of Technical Education. A special feature of this year's examination is that forty-eight candidates were examined in nine subjects, under the direction of the Institute, in New South Wales. Examinations were held in Sydney, Bathurst, and Newcastle. The question papers were sent out to Sydney, and the answers of these colonial condidates were forwarded to London, where they were examined together with those of other candidates, the date of the examination having been so timed as to render this arrangement possible. Sir Philip Magnus considers that the increase in the total number of candidates examined and of those who have passed is satisfactory. In 1886, 4764 candidates were examined, of whom 2627 passed; in 1887, 5508 were examined, of whom 3090 passed. The increase in the number of candidates in 1887 is 744 as against 796 in 1886. During the past session 365 classes were held in 121 different towns. Manchester heads the list of provincial centres from which the largest number of candidates have passed, the number being 183 as against 169 in the previous year. Next in order comes Glasgow with 169 as against 163, Leeds with 114 as against 81, Blackburn with 73 as against 10, Huddersfield with 69 as against 70, Belfast with 66 as against 74, Bradford with 63 as against 80.

The results of the survey and last census of India are that the area of the peninsula of Hindostan is 1,382,624 square miles, and the population 253,891,821. Although immense tracts of country are annually cultivated, according to the most recent survey ten million acres of land suitable for cultivation have not as yet been ploughed. At the same time, 120 millions of acres are returned as waste lands.

On July 21 the people of Nancy were astonished by the sudden appearance of an immense number of common ants, which were brought by a very strong wind. Most of the insects were wingless.

According to the *Free Press* of Singapore, a work which has occupied much of the recent attention of those Government officials connected with the Land and Survey Departments of the Straits Settlements has been completed, and has been sent to England. This is a map of the Malay Peninsula, based upon one produced in 1879 under the direction of the Straits Branch of the Royal Asiatic Society, but altered and improved by subsequent exploration.

In a recent number of the *Revue Scientifique*, M. Arnaudeau develops the idea of a double postal tube between Dover and Calais, to be suspended in air. Each tube should be

1 metre in diameter, and of thin metal, allowing the supports to be far apart, say 800 metres. In the tube, a train of ten to fifteen small waggons should run on rails on a floor, the motive power compressed and rarefied air actuating a piston. The lower part of one tube should hold telegraphic, and that of the other telephonic wires. The metallic foundation-piers, some of which should be as much as 70 metres high, should be of truncated-pyramid shape, and capable of floating at first, but gradually filled with masonry and water, and sunk to the bottom. These should support tall pillars having suspension-cables at the top. By the pumping out of the water, these piers could be raised and shifted if necessary.

IN the Exhibition recently opened at Havre there is an interesting collection of specimens of poisonous fishes. Some are poisonous when eaten; others are merely venomous. Among the first are many Sparoids, a Tetrodon, and many *Clupea*, which are abundant near the Cape of Good Hope. In the Japan Sea is found a very peculiar Tetrodon, which is sometimes used as a means of suicide. It brings on sensations like those produced by morphia, and then death. Another interesting collection in the Exhibition is that of a number of Bacteria, and pathogenetic microbes. This collection was formed by Prof. Cornil, of Paris.

AT the annual meeting of the Seismological Society of Japan, on May 27, Prof. S. Sekiya exhibited an interesting model of his own design, showing the motion of the ground at the time of an earthquake. The actual motion was magnified fifty times. At the same meeting, Prof. Milne read a paper on the effects produced by earthquakes upon the lower animals. Animals often show signs of alarm not only while an earthquake is going on, but before the shock is felt. Prof. Milne's friend, Mr. James Bissett, of Yokohama, testifies that thirty seconds before the first shock on the 15th of last January one of his ponies suddenly got up on its feet and pranced about in the stall, evidently terrified at the coming shake. A pony at Tokio was observed to act in a similar manner. Prof. Milne has had many opportunities, just before earthquakes, of confirming the fact that pheasants scream; and several observers have assured him that in like circumstances frogs suddenly cease croaking. Of all animals, geese, swine, and dogs are said to give the clearest indications of an approaching earthquake. It is said, too, that many birds show uneasiness, hiding their heads beneath their wings, and behaving in an unusual manner. Prof. Milne suggests that some of the lower animals may be sensitive to small motions which we do not notice. The terror manifested by intelligent animals like dogs and horses may be, he thinks, the result of their own experience, which has taught them that slight tremors are premonitory of movements more alarming. In the case of pheasants, frogs, and geese, alarm may be due solely to the tremors. Strange behaviour on the part of animals several hours or days before an earthquake Prof. Milne attributes for the most part to accidental causes. In volcanic districts, however, as he shows, it has sometimes happened that before an earthquake certain gases have emanated from the earth; and where this has occurred the smaller animals have not only been alarmed, but sometimes killed.

A VIOLENT shock of earthquake was felt on July 26 at Laghouat. It caused much consternation, these phenomena being very rare in the vicinity.

EARLY in December, an Exhibition of winter flowers, plants, and fruit will be opened at Mayence.

THE locust plague has done much damage this year in Algiers. All the efforts of the authorities to cope with it have proved fruitless, and it is feared that the evil will be not less formidable next year, the eggs deposited being numberless.

THE annual meeting of the North of England Institute of Mining and Mechanical Engineers was held on Saturday last in the building of the Newcastle Exhibition. Sir Lowthian Bell delivered his presidential address. Dealing with the progress of railroads and navigation, he pointed out that fifty years ago the tonnage sailing under the British flag might be taken at 750,000, of which a little above 50,000 consisted of steamers. By the end of 1885 this country possessed 3,456,562 tons of sailing ships, and 3,973,483 tons of steam vessels, making a total of 7,430,045 tons. Referring to compound engines, he said they all knew how the dangers attending the use of steam at a high pressure had been met by the introduction of the compound system, in which, by the use of three cylinders, a great addition to the expansive force of the steam was now extensively employed. To such an extent had this been carried that 350 tons of coal were now doing the work which formerly required 750. Mr. T. W. Bunning read a paper in which he advocated the federation of the different mining and mechanical associations in the kingdom on the lines of the Society of Chemical Industry. Sir Lowthian Bell was re-elected President.

THE additions to the Zoological Society's Gardens during the past week include a Malbrouck Monkey (*Cercopithecus cynosurus* ♂) from West Africa, presented by Mr. T. Sutton Flack; a Blue and Yellow Macaw (*Ara ararauna*) and a Red and Yellow Macaw (*Ara chloroptera*) from South America, presented by Mr. W. Reid Revell; a Green Turtle (*Chelone viridis*) from the West Indies, presented by Mr. James McGregor; two Griffon Vultures (*Gyps fulvus*), European, a Dark-green Snake (*Zamenis atrovirens*), European, deposited; a One-streaked Hawk (*Melierax monogrammicus*) from West Africa, an Elegant-grass Parakeet (*Eupherra elegans* ♀) from South Australia, purchased.

ASTRONOMICAL PHENOMENA FOR THE WEEK 1887 AUGUST 14-20.

(FOR the reckoning of time the civil day, commencing at Greenwich mean midnight, counting the hours on to 24, is here employed.)

At Greenwich on August 14

Sun rises, 4h. 45m.; souths, 12h. 4m. 30·3s.; sets, 19h. 24m.; decl. on meridian, 14° 24′ N.: Sidereal Time at Sunset, 16h. 56m.

Moon (New, August 19, 6h.) rises, 23h. 52m.*; souths, 7h. 40m.; sets, 15h. 35m.; decl. on meridian, 18° 18′ N.

Planet.	Rises. h. m.	Souths. h. m.	Sets. h. m.	Decl. on meridia ° ′
Mercury ...	... 3 9	... 10 49	... 18 29	... 17 58 N.
Venus ...	... 8 45	... 14 28	... 20 11	... 3 57 S.
Mars ...	... 1 55	... 10 5	... 18 15	... 22 32 N.
Jupiter...	... 11 11	... 16 21	... 21 31	... 10 24 S.
Saturn...	... 2 40	... 10 36	... 18 32	... 20 27 N.

* Indicates that the rising is that of the preceding evening.

August.	h.	
16 ...	— ...	Venus at her point of greatest evening brilliancy.
16 ...	20 ...	Mercury at greatest elongation from the Sun, 19° west.
1 ...	21 ...	Mercury in conjunction with and 0° 33′ nort of the Moon.
19 ...	— ...	Total eclipse of the Sun. The central line of totality passes from south of the Baltic across Europe, Asia, and Japan. At Greenwich and in England and Scotland generally the sun will rise partially eclipsed a few minutes only before termination of the eclipse. In Ireland the eclipse ends before sunrise.